

Claims 1-6 and 8-20 are pending in this application. Claims 1-6 and 8-20 stand rejected. Claim 7 has been cancelled.

The objection to the drawings is respectfully traversed. Figure 2 illustrates a cross-sectional view of an annular combustor. More specifically, within the cross-sectional view shown in Figure 2, water injection nozzles are shown connected to two of the swirl cups. Applicants respectfully submit that illustrating the water injection nozzles connected to the innermost swirl cup 72 and 74, is not necessary for an artisan of ordinary skill in the art to understand the invention, and as such, is not essential for a proper understanding of the disclosed invention. More specifically, Applicants respectfully submit that an artisan of ordinary skill in the art would understand that the water injection nozzles are connected to all of the swirl cups, including the innermost swirl cup, and that the connection to the innermost swirl cup is not shown in Figure 2 because of the orientation of the annular combustor. For the reasons set forth above, Applicants respectfully request the objection to the drawings be withdrawn.

The rejection of Claims 1-4, 6, 8-11, and 15-17 under 35 U.S.C. § 103 as being anticipated by Schilling et al. in view of Horner et al. or Borkowicz et al. is respectfully traversed.

Schilling et al. describe a multiple annular combustion apparatus 25. Combustor apparatus 25 includes a domed end 35 that includes a plurality of domes 37, 39, and 41. Each dome 37, 39, and 41 includes a plurality of spaced openings that receive mixers for mixing air and fuel prior to entry into a common combustion chamber 29. Schilling et al. do not describe nor suggest water injection into domes 37, 39, and 41.

Horner et al. describe a continuous-burning combustor 10 for use with a gas turbine engine. Combustor 10 includes a single dome assembly 22 that includes a swirl cup 28, a dome plate 32, and a swirler 38. Swirler 38 receives a fuel nozzle 26 therethrough that supplies fuel

and water to a combustion chamber 14 defined within combustor 10. Horner et al. do not describe nor suggest operating combustor 10 with a combustor fuel/air mixture equivalence ratio less than one.

Borkowicz et al. describe a gas turbine 10 including a plurality of combustors 14 that extend circumferentially within gas turbine 10. Each combustor 14 includes a single dome, a combustion chamber 70, and a plurality of fuel nozzles 32 that are arranged about a longitudinal axis of combustor 14. Each combustor fuel chamber 70 is downstream and in flow communication with the dome. Each fuel nozzle 32 includes a premix passage 60 and a diffusion passage 74. Borkowicz et al. do not describe nor suggest operating combustor 14 with a combustor fuel/air mixture equivalence ratio less than one.

Joshi et al. describe a duel fuel mixer 24 for use with a single domed combustor 10. Mixer 24 includes a swirl cup 22 and inner and outer swirlers 26 and 28, respectively. Mixer 24 is in flow communication with gas fuel passages 38 and a liquid fuel manifold 40. Joshi et al. do not describe nor suggest injecting water into combustor 10.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Schilling et al. according to the teachings of either Horner et al. or Borkowicz et al., and also using the teachings of Joshi et al. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Schilling et al. with either Horner et al. or Borkowicz et al., and with Joshi et al. because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or

suggests to combine the disclosures, other than Applicants' own teaching. Only the conclusory statement that "[i]n this case, the teachings are clear to employ water/steam injection into the premixer of a gas turbine combustor in order to lower NOx emissions and/or CO emissions. Consequently, it is noted that the combination of references applied fully cover applicant's claimed invention." Applicants respectfully submit however, that a closer examination of the prior art would reveal that the prior art teaches away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, neither Horner et al. nor Borkowicz et al. describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Furthermore, Joshi et al. describe a dual fuel nozzle, but do not describe nor suggest injecting water into a combustor. Accordingly, Applicants respectfully submit that there is no suggestion or motivation to combine Schilling et al. with either Horner et al. or Borkowicz et al., or further with Joshi et al.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Further, and to the extent understood, none of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., considered alone or in combination, describe nor suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method for operating a gas turbine combustor using a water delivery system, the combustor including a plurality of domes, the water delivery

system is connected to the gas turbine engine, and the method comprising the step of “operating the gas turbine engine with a combustor including a plurality of domes and with a combustor fuel/air mixture equivalence ratio less than one... ..supplying at least one of water and steam into the gas turbine engine with the water delivery system....”

None of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., considered alone or in combination, describe or suggest a method for operating a gas turbine combustor using a water delivery system, wherein the combustor includes a plurality of domes, and the water delivery system is connected to the gas turbine engine, in combination with method steps of operating the gas turbine engine with a combustor including a plurality of domes and with a combustor fuel/air mixture equivalence ratio less than one, and supplying at least one of water and steam into the gas turbine engine with the water delivery system. Rather, Schilling et al., Horner et al., Borkowicz et al., and Joshi et al., appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, neither Horner et al. nor Borkowicz et al. describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Furthermore, Joshi et al. describe a dual fuel nozzle, but do not describe nor suggest injecting water into a combustor. Accordingly, Applicants respectfully submit that Claim 1 is patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.

Claims 2-4 depend from independent Claim 1. When the recitations of Claims 2-4 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-4 likewise are patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.

Claim 6 recites a combustor system for a gas turbine engine, wherein the combustor system comprises “a combustor comprising a plurality of domes, at least one of said combustor

domes configured to operate with a fuel/air mixture equivalence ratio less than one....” None of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., considered alone or in combination, describe nor suggest a combustor system for a gas turbine engine, wherein the combustor system includes a combustor including a plurality of domes, wherein at least one of the combustor domes is configured to operate with a fuel/air mixture equivalence ratio less than one. Rather, Schilling et al., Horner et al., Borkowicz et al., and Joshi et al., appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, neither Horner et al. nor Borkowicz et al. describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Furthermore, Joshi et al. describe a dual fuel nozzle, but do not describe nor suggest injecting water into a combustor. For the reasons set forth above, Claim 6 is submitted to be patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.

Claims 8-11 depend from independent Claim 6. When the recitations of Claims 8-11 are considered in combination with the recitations of Claim 6, Applicants submit that dependent Claims 8-11 likewise are patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.,

Claims 15-17 depend from Claim 14 which recites a gas turbine engine comprising a combustor system comprising a combustor and a water delivery sub-system...said combustor being a lean premix combustor comprising a plurality of domes...at least one of said domes configured to operate with a fuel/air mixture equivalence ratio less than one....” None of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., considered alone or in combination, describe nor suggest a gas turbine engine including a combustor system including a combustor that includes a combustor and a water delivery sub-system, wherein the combustor includes a plurality of domes such that at least one of the domes is configured to operate with a fuel/air mixture equivalence ratio less than one. Rather, Schilling et al., Horner et al., Borkowicz

et al., and Joshi et al., appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, neither Horner et al. nor Borkowicz et al. describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Furthermore, Joshi et al. describe a dual fuel nozzle, but do not describe nor suggest injecting water into a combustor. For the reasons set forth above, Claim 14 is submitted to be patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.

Claims 15-17 depend from independent Claim 14. When the recitations of Claims 15-17 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 15-17 likewise are patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Joshi et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-4, 6, 8-11, and 15-17 be withdrawn.

The rejection of Claims 5, 12-14, and 18-20 under 35 U.S.C. § 103 as being unpatentable over Schilling et al. in view of either Horner et al. or Borkowicz et al., and further in view of Talabisco et al. or Maslak is respectfully traversed.

Schilling et al., Horner et al., and Borkowicz et al. are described above. Talabisco et al. describe a method and apparatus for maintaining a constant level of NO<sub>x</sub> and minimizing CO emissions from a gas turbine. The turbine includes a compressor 12 and a combustor 14. Fuel, air, and steam is injected into combustor 14 based on a load of the turbine.

Maslak describes water and steam injection in a cogeneration system 10. System 10 includes a gas turbine 11 including a compressor 12 and a combustor 18. Water and steam are injected based on gas turbine power output.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Schilling et al. according to the teachings of either Horner et al. or Borkowicz et al., and also using the teachings of Talabisco et al. or Maslak. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Schilling et al., Horner et al., Borkowicz et al., Talabisco et al. or Maslak, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Schilling et al. with either Horner et al. or Borkowicz et al., and with Talabisco et al. or Maslak, because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Only the conclusory statement that "[i]n this case, the teachings are clear to employ water/steam injection into the pre-mixer of a gas turbine combustor in order to lower NO<sub>x</sub> emissions and/or CO emissions. Consequently, it is noted that the combination of references applied fully cover applicant's claimed invention." Applicants respectfully submit however, that a closer examination of the prior art would reveal that the prior art teaches away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, none of Horner et al., Borkowicz et al., Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Accordingly, Applicants respectfully submit that there is no suggestion or motivation to combine Schilling et al. with either Horner et al. or Borkowicz et al., or further with Talabisco et al. or Maslak.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Further, and to the extent understood, none of Schilling et al., Horner et al., Borkowicz et al., or Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 5 depends from Claim 1 which recites a method for operating a gas turbine combustor using a water delivery system, the combustor including a plurality of domes, the water delivery system is connected to the gas turbine engine, and the method comprising the step of "operating the gas turbine engine with a combustor including a plurality of domes and with a combustor fuel/air mixture equivalence ratio less than one... ..supplying at least one of water and steam into the gas turbine engine with the water delivery system...."

None of Schilling et al., Horner et al., Borkowicz et al., Talabisco et al. or Maslak, considered alone or in combination, describe or suggest a method for operating a gas turbine combustor using a water delivery system, wherein the combustor includes a plurality of domes, and the water delivery system is connected to the gas turbine engine, in combination with method steps of operating the gas turbine engine with a combustor including a plurality of domes and with a combustor fuel/air mixture equivalence ratio less than one, and supplying at least one of water and steam into the gas turbine engine with the water delivery system. Rather, Schilling et al., Horner et al., Borkowicz et al., Talabisco et al. and Maslak,, appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a



plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, none of Horner et al., Borkowicz et al., Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. Accordingly, Applicants respectfully submit that Claim 1 is patentable over Schilling et al. in view of either Horner et al. or Borkowicz et al., and further in view of Talabisco et al. or Maslak.

Claim 5 depends from independent Claim 1. When the recitations of Claim 5 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 5 likewise is patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of Talabisco et al. or Maslak.

Claims 12 and 13 depend from Claim 6 which recites a combustor system for a gas turbine engine, wherein the combustor system comprises “a combustor comprising a plurality of domes, at least one of said combustor domes configured to operate with a fuel/air mixture equivalence ratio less than one....” None of Schilling et al., Horner et al., Borkowicz et al., or Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest a combustor system for a gas turbine engine, wherein the combustor system includes a combustor including a plurality of domes, wherein at least one of the combustor domes is configured to operate with a fuel/air mixture equivalence ratio less than one. Rather, Schilling et al., Horner et al., Borkowicz et al., Talabisco et al. and Maslak, appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, none of Horner et al., Borkowicz et al., Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. For the reasons set forth above, Claim 6 is submitted to be patentable over Schilling et al. in view of either Horner et al. or Borkowicz et al., and further in view of Talabisco et al. or Maslak.

Claims 12 and 13 depend from independent Claim 6. When the recitations of Claims 12 and 13 are considered in combination with the recitations of Claim 6, Applicants submit that dependent Claims 12 and 13 likewise are patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of either Talabisco et al. or Maslak.

Claims 18-20 depend from Claim 14 which recites a gas turbine engine comprising a combustor system comprising a combustor and a water delivery sub-system...said combustor being a lean premix combustor comprising a plurality of domes...at least one of said domes configured to operate with a fuel/air mixture equivalence ratio less than one....” None of Schilling et al., Horner et al., Borkowicz et al., or Joshi et al., considered alone or in combination, describe nor suggest a gas turbine engine including a combustor system including a combustor that includes a combustor and a water delivery sub-system, wherein the combustor includes a plurality of domes such that at least one of the domes is configured to operate with a fuel/air mixture equivalence ratio less than one. Rather, Schilling et al., Horner et al., Borkowicz et al., Talabisco et al. and Maslak, appear to teach away from the present invention. More specifically, Schilling et al. describe a combustor that includes a plurality of domes, but Schilling et al. do not describe nor suggest water injection into the combustor. In addition, none of Horner et al., Borkowicz et al., Talabisco et al. or Maslak, considered alone or in combination, describe nor suggest operating a combustor including a plurality of domes that are operable with a combustor fuel/air mixture equivalence ratio less than one. For the reasons set forth above, Claim 14 is submitted to be patentable over Schilling et al. in view of either Horner et al. or Borkowicz et al., and further in view of Talabisco et al. or Maslak.

Claims 18-20 depend from independent Claim 14. When the recitations of Claims 18-20 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 18-20 likewise are patentable over Schilling et al. in view of Horner et al. or Borkowicz et al., and further in view of either Talabisco et al. or Maslak.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 5, 12-14, and 18-20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

This paper is filed by the undersigned, who is not presently an attorney of record, pursuant to 37 C.F.R. 1.34(a), MPEP 405, at the instruction of the attorney of record.

Respectfully Submitted,



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Robert B. Reeser III  
Registration No. 43,548  
ARMSTRONG TEASDALE LLP  
One Metropolitan Square, Suite 2600  
St. Louis, Missouri 63102-2740  
(314) 621-5070